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# The Reform in Government Expenditure and the Standard of Living in Bahrain

*Fatema Alaali*

## Abstract

The drop of oil prices since the second half of 2014 have affected the credit risk and liquidity situation in Bahrain. Therefore, Bahrain have implemented substantial economic diversification in the economic structure including manufacturing, refining, tourism, trade and finance. With the recognition of the importance of governments expenditure restructuring, Bahrain government introduced number of initiatives such as streamlining government expenditure, increasing revenues, and redirecting government subsidies towards eligible citizens. Understanding the relationship between revenues, government spending and economic growth is an essential perception in evaluating the efficiency of government's strategy in managing its resources and the impact on the standard of living in any country. This chapter examines the relationship between total government expenditure as well as sectoral government spending (specifically education and health sectors), oil revenues and the economic growth of Bahrain using time series data over the period 1989–2015. To achieve this aim, the vector error correction model (VECM) is employed. In order to ensure the sustainability of resources and maintain economic growth, Bahrain should continue managing its expenditure, by cutting down expenses on certain sectors through privatization, and increasing spending on health and education sectors.

**Keywords:** Economic Growth, Health Expenditure, Education Expenditure, Human Capital, Oil Revenues, VECM

## 1. Introduction

On the 2nd of June 1932, history was made in Bahrain when oil was discovered in the first well in “Jebel Al Dukhan” making it the leading country among the Arabian Gulf countries in oil discovery. Since the establishment of the first refinery, oil and gas have played a significant part in the economic side of Bahrain. This is translated in the value of the share of oil and gas revenues to total revenues of Bahrain. The Ministry of Finance reports show that the share of oil and gas revenues formed 60.4% of total revenues in 1990 and continued to increase and reached 87.8% in the year 2011.

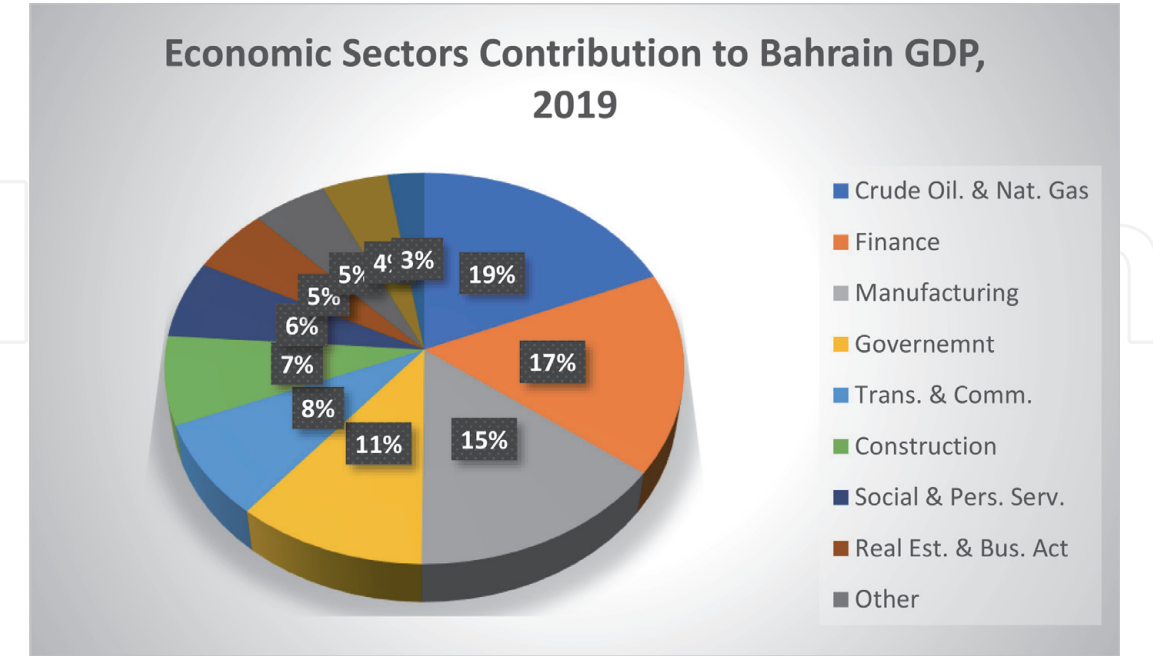
There were many trials since the seventies of the 20th century to shift the economy from oil sector to non-oil sectors such as manufacturing, finance and tourism. One of the Bahrain Government initiatives to set the foundation of the

economic diversification was through its long-run strategy procedure “Bahrain 2030 Vision” that was established in October 2008. The main aim of this vision is to build a better life for every Bahraini. One of the guiding principles of this vision is the sustainability. Bahrain government is working on enabling the private sector to stimulate economic growth. By doing so, Bahrain Government will be able to employ its resources in the investment in its human capital through training and education specifically in the area of applied sciences.

The 2019–2022 Government Action Plan focuses on achieving number of objectives including the investment in citizens by developing and sustaining the government services in certain sectors such as education and health. Moreover, the action plan aims to support creativity, youth, gender equity and sports. As a subsequent of the collaboration parties of the society, the contribution of non-oil sectors to Bahrain GDP increased over time. **Figure 1** shows the contribution of the different economic sectors to the GDP of Bahrain. In the year 2019, the second largest contributor to Bahrain GDP after the oil sector is the Finance sector with 17% share. The manufacturing sector comes next with a stake of 15%.

With all of these attempts to achieve economic diversification, oil sector remains the highest contributor to Bahrain GDP. Since the drop in oil prices at the end of 2014, Bahrain is facing the largest budget deficit among the rest of the GCC countries. Number of initiatives were introduced between the years 2015 and 2017 managed to reduce the budget deficit from –13% to –10.1% of GDP over the same period.<sup>1</sup> The initiatives taken over this period includes i) decreasing operational expenditure, ii) establishing optional retirement program for the public sector employees, iii) Balancing the water and electricity revenues and expenditure, iv) assigning cash subsidies to the needy citizens, v) boosting the effectiveness of government spending, and vi) increasing non-oil revenues.

As an attempt to investigate the long and short run impacts of the oil revenues and government expenditure on the economic growth of Bahrain, this chapter



**Figure 1.** Economic sectors contribution to Bahrain GDP, 2019. [Source: Bahrain economic quarterly, Q3 2019 – Ministry of Finance and National Economy].

<sup>1</sup> Fiscal Balance Program document [https://www.mofne.gov.bh/fbp\\_en.pdf](https://www.mofne.gov.bh/fbp_en.pdf).

employs yearly data for oil and gas revenues, total government expenditure and GDP growth and estimates the relationship between them using vector error correction model (VECM). Moreover, the sectoral relationship with the economic growth is examined using the ministry of health and ministry of education expenditures. The results show that oil and gas revenues have a positive impact on economic growth while the government expenditure affects economic growth negatively. However, when looking at the individual impact of education and health expenditure on economic growth, the estimation results indicate that both have a positive impact on economic growth of Bahrain.

The chapter is constructed as follows: a brief of the literature review is reported in Section 2. The employed data and methodology are explained in Section 3. Section 4 demonstrates the results, and the conclusions of this chapter are stated in Section 5.

## **2. Literature review**

A considerable number of studies have concentrated on the relationship between natural resource wealth and economic growth. The motivation behind these studies is to investigate the potential benefit of this wealth in promoting economic growth. The results of most of these studies agree on the negative impact of the abundance natural resources. Using a large cross-country data, Sachs and Warner [1] conclude that the natural resource wealth has a harmful effect on the economic growth. Gylfason [2] interprets this harmful impact as the result of the false sense of security that these nations develop regarding their natural resources which may drive them to neglect human capital accumulation. But there is a great distinct between having natural resources and using it. Botswana is an obvious example for an African country whose 80% of its exports are diamonds, copper, nickel and gold could escape the natural resource curse. The reason behind this is that all the mineral revenues are spent on investment such as capital projects and recurrent spending on education and health [3, 4].

The literature proposes various channels through which gifted resources may obstruct economic growth. The first channel is the Dutch disease. The fluctuations in the prices of raw materials causes fluctuations in exports revenues which may cause variation in exchange rate. Volatile exchange rates lead to unpredictability that may harm the exports and foreign investments. Moreover, the natural resource-based industry may pay higher wages compared to other industries which makes it difficult for the other industries to compete. The second channel is through the massive natural resource rents accompanied by weak markets in most of the developing countries. The third channel is through decreasing the public and private motivation in human capital accumulation due to underestimating the long-term value of education. The fourth channel is through retarding the development of financial institutions which may dampen savings and investments that leads to reducing economic growth [5].

The relationship between the government spending and economic growth was investigated in an enormous number of studies with different types of economies. Different results were obtained from these studies due to the variable economic development levels, different periods of time and the use of distinct methodologies. For example, Barro [6] who employed a panel of 98 countries over 36 years found that growth is inversely related to the share of government expenditure. Using OECD sample, Agell et al. [7] found no conclusion about the effect of public sector spending on growth as the relation is easily tilted from negative to positive by introducing control variables. Devarajan et al. [8] who utilized data from 43

developing countries and conclude that an increase in the current expenditures affects growth positively whereas the capital expenditure has a negative impact on economic growth, which indicates that excess capital spending may become unproductive. In a study that used seven transition economies from South Eastern Europe, Alexiou [9] found that government spending on capital formation affects growth positively. The empirical evidence of Lamartina and Zaghini [10] paper provides evidence of structural positive correlation between GDP per capita and public expenditure in a sample of 23 OECD countries. Using data for EU-28 countries, Dudzevičiūtė et al. [11] investigated the government spending and economic growth nexus. Positive relationship has been detected in 4 countries, negative correlation in other 4 countries and insignificant relationship in the remaining countries.

A great number of empirical studies scrutinized the effect of the sectoral government expenditure on economic growth in different economies. For example, Baum and Lin [12] investigated the differential impact of the various types of government expenditures on economic growth using a sample of 58 countries. Their results show a positive impact of educational expenditures on economic growth but insignificant impact of welfare and defense expenditures on economic growth. In a study that used data from East Africa, Gisore et al. [13] found that expenditures on health and defense have positive impact on economic growth whereas educational expenditure has insignificant impact on growth.

At the level of GCC countries, Al-Yousif [14] applied a Granger-causality test to examine the relationship between education expenditure and economic growth in the six GCC countries and conclude that the nature of this relationship cannot be generalized across countries. Ghali [15] studied the relationship between economic growth and government expenditure in Saudi Arabia and found insignificant impact of government expenditure on economic growth. Hamdi and Sbia [16] applied the Toda and Yamamoto procedure to investigate the relationship between government revenues, expenditure and gross domestic product using data for the six GCC countries over the period 1990–2010. Their results show that there is a unidirectional causality from government expenditure to GDP in Bahrain only while GDP granger cause government expenditure in Qatar and Oman. Ahmad and Masan [17] found that there are positive long run relationship between oil revenues, government expenditure and economic growth of Oman.

### 3. Data and methodology

#### 3.1 Data

In order to achieve the objective of this study, annual Gross Domestic Product of Bahrain (GDP) at constant prices is obtained from the World Bank Data and used as a measure for economic growth. Oil & Gas Revenues (Rev), Total Expenditure (Exp), Ministry of Health Expenditure (H-Exp) and Ministry of Education Expenditure (E-Exp) are obtained from the Ministry of Finance. The time period of the study is from 1989 to 2015. All the variables have been transformed using natural logarithm transformation. **Table 1** presents the descriptive statistics of all the variables.

Variable	Mean	Std. Dev.	Min.	Max.
GDP	6844.221	2546.688	3202.183	11572.71
Rev	1.085	0.844	0.242	2.662
Exp	1.451	1.002	0.496	3.545



Variable	Mean	Std. Dev.	Min.	Max.
H-Exp	0.107	0.073	0.035	0.263
E-Exp	0.147	0.087	0.058	0.327

Notes: GDP is the Gross Domestic Product, Rev. is the Oil & Gas Revenue, Exp is the Total Expenditure, H-Exp is the Ministry of Health Expenditure and E-Exp is the Ministry of Education Expenditure. All the data are in millions of Bahraini Dinars.

**Table 1.**  
Descriptive statistics.

### 3.1.1 Stationarity tests

The basic procedure for testing the variables includes three steps. The first step is to test the stationarity of the variables and examine their integration level. In order to do so, the Augmented Dickey and Fuller [18] ADF test, Phillips and Perron [19] - PP and Kwiatkowski et al. [20] - KPSS are employed.

### 3.1.2 Cointegration test

After checking the stationarity of all the series and getting all the variables to be integrated of the same order, the second step is to investigate the presence of long run relationship between all the variables in each Model. Cointegration shows that the variables jointly move in the long run and the error term generated from the linear combination of all the variables measures the divergence of the variables from their joint long run relationship, which can be used to forecast their values in the future [21]. To determine this relationship, Johansen Cointegration Test is used [22, 23].

The procedure of cointegration is estimated using an unrestricted vector autoregressive model (VAR) with error correction specification:

$$\Delta Y_t = \Pi Y_{t-1} + \sum_{i=1}^{k-1} \Gamma_i \Delta Y_{t-i} + \Phi D_t + v_t \tag{1}$$

where  $Y_t$  contains all  $n$  variables of the model which are integrated of order one –  $I(1)$ ,  $\Pi$ ,  $\Gamma_i$  and  $\Phi$  are parameter matrices to be estimated,  $D_t$  is a vector with deterministic elements (constant, trend) and  $v_t$  is a vector of random errors. Eq. (1) indicates that there will be no relationship between two series of different cointegration order. Johansen cointegration test estimates the rank ( $r$ ) of the matrix  $\Pi$ . If  $r = 0$ , all variables are not cointegrated. If  $0 < r < N$ ,  $r$  cointegrating vectors exist. Johansen's cointegration test uses two likelihood statistics. The first is the Trace test, which examines whether the number of cointegrating vectors ( $r$ ) is less than or equal to  $r$ . The second is the maximum eigenvalue, which test the number of cointegrating vectors is  $r$  against the alternative of  $r + 1$  cointegrating vectors.

## 3.2 Methodology

Finally, when getting all the variables to be integrated of order one,  $I(1)$  and cointegrated (joint movement in the long run), the short and long run relationships between Economic Growth, Revenues and Government Expenditure can be estimated. This can be done using the Vector Error Correction Model (VECM) that was developed by Engle and Yoo [24]. The VECM is used to allow for short-run adjustment dynamics and show the speed of this adjustment to the long-run equilibrium.

In a VECM it does not matter if some of the variables are endogenous, because no contemporaneous terms appear in the equation.

Model 1 is used to estimate the long and short run relationship between Bahrain economic growth, oil and gas revenues and total government expenditure.

Model 1:

$$\begin{aligned} \Delta \ln GDP_t = & \alpha_1 + \alpha_2 \ln GDP_{t-1} + \alpha_3 \ln Rev_{t-1} + \alpha_4 \ln Exp_{t-1} + \sum_{i=1}^2 \beta_{1i} \Delta \ln GDP_{t-1} \\ & + \sum_{i=1}^2 \beta_{2i} \Delta \ln Rev_{t-1} + \sum_{i=1}^2 \beta_{3i} \Delta \ln Exp_{t-1} + \gamma_1 ECT_{t-1} + \varepsilon_t \end{aligned} \quad (2)$$

where  $\Delta$  represents the first difference,  $\ln GDP$  is the natural logarithm of gross domestic product,  $\ln Rev$  is the natural logarithm of oil and gas revenues,  $\ln Exp$  is the natural logarithm of total expenditure and  $ECT$  is the error correction term.

To examine the relationship between sectoral government expenditure and economic growth, Model 2 estimates the long and short relationships between economic growth and ministry of health expenditure.

Model 2:

$$\begin{aligned} \Delta \ln GDP_t = & \alpha_1 + \alpha_2 \ln GDP_{t-1} + \alpha_3 \ln HExp_{t-1} + \sum_{i=1}^2 \beta_{1i} \Delta \ln GDP_{t-1} \\ & + \sum_{i=1}^2 \beta_{3i} \Delta \ln HExp_{t-1} + \gamma_1 ECT_{t-1} + \varepsilon_t \end{aligned} \quad (3)$$

where  $\ln HExp$  is the natural logarithm of ministry of health expenditure.

Model 3 examines the short and long run relationship between Bahrain economic growth and ministry of education expending.

Model 3:

$$\begin{aligned} \Delta \ln GDP_t = & \alpha_1 + \alpha_2 \ln GDP_{t-1} + \alpha_3 \ln EExp_{t-1} + \sum_{i=1}^2 \beta_{1i} \Delta \ln GDP_{t-1} \\ & + \sum_{i=1}^2 \beta_{3i} \Delta \ln EExp_{t-1} + \gamma_1 ECT_{t-1} + \varepsilon_t \end{aligned} \quad (4)$$

where  $\ln EExp$  is the natural logarithm of ministry of education expenditure and  $ECT$  is the error correction term. The Akaike Information Criteria (AIC) is used to select the appropriate lag length.

## 4. Results

### 4.1 Unit root and Cointegration test results

The null hypothesis of the Augmented Dickey Fuller and Phillips and Perron tests is the existence of a unit root, whereas the null hypothesis of the KPSS test is that the time series variable is stationary. The three tests are implemented for the variables at level and at first difference. **Table 2** summarizes the results of the unit root tests. The results show that all the variables are stationary at first difference, which means that all of them are  $I(1)$ .

Since  $\ln GDP$ ,  $\ln Rev$  and  $\ln Exp$  are integrated of the same level, therefore Johansen's cointegration test is conducted to examine the long-run equilibrium

	ADF		PP		KPSS	
	Level	First diff.	Level	First diff.	Level	First diff.
lnGDP	−1.450	−4.472***	−1.380	−4.533***	0.067	0.076
lnRev	−1.046	−5.440***	−0.960	−5.606***	0.124	0.124
lnExp	0.108	−3.703**	0.052	−3.781***	0.215**	0.144
lnH-Exp	0.241	−2.237	0.115	−2.262	0.215**	0.141
lnE-Exp	0.776	−2.773*	0.600	−2.764*	0.219***	0.111

Notes: ADF is the Augmented Dickey and Fuller [18] unit root test. PP is Phillips and Perron [19] unit root test. KPSS is Kwiatkowski et al. [20] Stationarity test.  
\*, \*\*, \*\*\* present 10%, 5% and 1% level of significance, respectively. lnGDP is the natural logarithm of Gross Domestic Product, lnRev is the natural logarithm of Oil & Gas Revenue, lnExp is the natural logarithm of Total Expenditure, lnH-Exp is the natural logarithm of Ministry of Health Expenditure and lnE-Exp is the Ministry of Education Expenditure.

**Table 2.**  
Unit root test results.

Maximum rank	Parms	LL	Eigenvalue	Trace statistic	5% Critical value
0	12	85.494		49.228	29.68
1	17	102.564	0.745	15.088*	15.41
2	20	109.320	0.418	1.575	3.76
3	21	110.108	0.061		

\* indicates that this is the value of rank (*r*) selected by Johansen’s multiple-trace test procedure.

**Table 3.**  
Model 1 Cointegration test results.

relationship between the three series. **Table 3** shows the results of Model 1 Eq. (2) Cointegration Test Results. This test was estimated using 2 lags according to the AIC of a VAR model for the variables of interest. The trace statistic and maximum eigenvalue states that the null hypothesis of the presence of a maximum of one cointegrating equation ( $r \leq 1$ ) cannot be rejected. This indicates the existence of a long-run relationship between economic growth, oil and gas revenues and government expenditure in Bahrain.

Johansen’s cointegration test is applied to the variables employed in Model 2 Eq. (3) and Model 3 Eq. (4) using a maximum lag of 1 according to the AIC of a VAR model for both models. **Tables 4** and **5** indicate the presence of long-run relationships between economic growth and health expenditure and between economic growth and education expenditure, respectively.

Maximum rank	Parms	LL	Eigenvalue	Trace statistic	5% Critical value
0	0	72.297		51.803	19.96
1	4	94.744	0.823	6.710*	9.42
2	6	98.198	0.227		

\* indicates that this is the value of rank (*r*) selected by Johansen’s multiple-trace test procedure.

**Table 4.**  
Model 2 Cointegration test results.



Maximum rank	Parms	LL	Eigenvalue	Trace statistic	5% Critical value
0	0	76.193		55.709	19.96
1	4	100.070	0.841	7.955*	9.42
2	6	104.048	0.264		

\* indicates that this is the value of rank (r) selected by Johansen's multiple-trace test procedure.

Table 5.  
Model 3 Cointegration test results.

4.2 Vector error correction model (VECM) results

4.2.1 Model 1 estimation results

Since the economic growth, oil and gas revenues and government expenditure variables are stationary at first difference and have a long run cointegration, the VECM can be employed to investigate this relationship. **Table 6** presents the results of estimating Eq. (2) using VECM approach. The results show that oil and gas revenues have a significant positive impact on the economic growth of Bahrain whereas the government expenditure has a significant negative impact on Bahrain economic growth. The error correction term is negative and significant.

4.2.2 Model 2 estimation results

**Table 7** reports the results of estimating Eq. (3) using the VECM approach. The results show that government expenditure on health has a long run positive impact on economic growth that is significant at 10% level of significance.

Long-run relationship				
lnGDP	1			
lnRev	0.844*** (0.104)			
lnExp	-0.544*** (0.135)			
constant	-16.931*** (0.869)			
Short-run relationships		$\Delta \ln GDP$	$\Delta \ln Rev$	$\Delta \ln Exp$
$\Delta \ln GDP_{t-1}$		0.261 (0.195)	2.590 (1.93)	0.2663 (0.587)
$\Delta \ln Rev_{t-1}$		-0.070** (0.028)	-0.032 (0.280)	-0.126 (0.085)
$\Delta \ln Exp_{t-1}$		0.085 (0.082)	0.566 (0.812)	0.099 (0.247)
ECT		-0.116*** (0.041)	0.478 (0.403)	-0.210* (0.122)

Notes: lnGDP is the natural logarithm of Gross Domestic Product, lnRev is the natural logarithm of Oil & Gas Revenue, lnExp is the natural logarithm of Total Expenditure and ECT is the error correction term. Numbers between brackets are std. errors.  
\*, \*\*, \*\*\* present 10%, 5% and 1% level of significance, respectively.

Table 6.  
VECM results – Model 1.

Long-run relationship		
lnGDP	1	
lnH-Exp	0.365* (0.199)	
constant	17.229*** (3.627)	
Short-run relationships		$\Delta \ln H - Exp$
ECT	-0.037*** (0.003)	-0.053 *** (0.009)

Notes: lnGDP is the natural logarithm of Gross Domestic Product, lnH-Exp is the natural logarithm of Ministry of Health Expenditure and ECT is the error correction term. Numbers between brackets are std. errors.  
\*, \*\*, \*\*\* present 10%, 5% and 1% level of significance, respectively.

Table 7.  
VECM results – Model 2.

Long-run relationship		
lnGDP	1	
lnE-Exp	0.576*** (0.0519)	
constant	11.71	
Short-run relationships		$\Delta \ln E - Exp$
ECT	-0.117*** (0.051)	0.169 (0.107)

Notes: lnGDP is the natural logarithm of Gross Domestic Product, lnE-Exp is the natural logarithm of Ministry of Education Expenditure and ECT is the error correction term. Numbers between brackets are std. errors.  
\*, \*\*, \*\*\* present 10%, 5% and 1% level of significance, respectively.

Table 8.  
VECM results – Model 3.

4.2.3 Model 3 estimation results

Eq. (4) estimation results are presented in **Table 8**. The results indicate that government spending on education has a positive and highly significant impact on Bahrain economic growth.

5. Conclusion

This chapter employs yearly data over the period (1989–2015) for oil and gas revenues, total government expenditure and GDP growth to estimates the relationship between them using vector error correction model (VECM). Moreover, the sectoral relationship with the economic growth is examined using the ministry of health and ministry of education expenditures. The results show that oil and gas revenues have a positive impact on economic growth while the government expenditure affects economic growth negatively. However, when looking at the individual impact of education and health expenditure on economic growth, the estimation results indicate that both have a positive impact on economic growth of Bahrain.


The results imply that for Bahrain to maintain long run economic growth, there should be a strategic plan to invest in its human capital through raising the quality and quantity of education. This will lead to productivity growth through education's impact on innovation and creativity as well as the adaptation to any changes in economic situations. High quality education will allow people to participate actively in their societies. Moreover, an individual with a better health will enjoy more of productive years. So, one of Bahrain's channels to achieve sustainable economic growth is through redistributing its government expenditure to fulfill the requirements of education and health sectors.

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